

# Technology Innovation Project



Project Brief

## TIP 233: *Field Evaluation of the Service Life of Foul-Release Coatings in the Columbia River*

### Context

The zebra mussel, *Dreissena polymorpha*, and the quagga mussel, *Dreissena rostriformis bugensis*, can cause economic and ecological damage. These freshwater mussels are not native to the United States and can firmly attach to hard substrates using byssal threads. High levels of mussel recruitment and firm attachment occur on mild steel, concrete and PVC structures. They can clog screens and pipes and foul other hard substrates, which can lead to interference in the operation of hydropower facilities on the river. If they become established in the Columbia River Basin (CRB), management costs at hydropower facilities are expected to exceed \$23 million with annual costs estimated at about \$100,000 per facility.

### Description

The effective service life of the foul-release coatings is under evaluation for resistance to damage caused by field deployment (i.e. abrasion, impact, immersion, and substrate adhesion). Resistance to quagga and zebra mussel attachment relative to existing protective coatings used on immersed concrete and steel as well as bare concrete (an acrylic sealer, and a vinyl paint, respectively) are also studied.

This project continues the panel experiment in the Columbia River that was initiated in Fiscal Year 2011 under the BPA TI program. Coated concrete and steel panels deployed in the Columbia River were evaluated in the period between October 1, 2012 and September 30, 2013. The project funds the continuation of this experiment for the next Fiscal Year including panel evaluations after nine and 15 months of immersion in the Columbia River and the San Justo Reservoir, and includes efforts to transfer these technologies to user groups such as the U.S. Army Corps of Engineers (USACE).

### Why It Matters

Established populations of zebra or quagga mussels have not been detected in the Columbia River Basin, but there is a high likelihood of introduction, e.g., from adults attached to boats trailered from the Great Lakes or Lake Mead. The use of foul-release coatings will not be the primary means by which the impacts of zebra and quagga mussels are controlled at hydropower facilities, but may instead be used as part of an integrated control effort to substantially reduce macrofouling problems caused by zebra and quagga mussels on particular components. Finding an

appropriate foul-release coating will result in reduced operations and maintenance costs should a freshwater macrofouling organism become established in the CRB.

Use of biocides in the Columbia River might impact threatened and endangered species. Foul-release coatings do not involve biocides. Foul-release coatings do make pesticidal claims, e.g., “provides fouling control” or “reduces fouling,” however, and may be required to register under FIFRA. Antifouling and foul-release coatings are expensive but foul-release coatings may prove to be cost-effective for mitigation of macrofouling on CRB facility components like trash racks, intake bays, intake tunnels, and pump wells compared to other control means such as manual cleaning and chlorination.

It is critical to demonstrate the expected service life of these coatings under Columbia River conditions compared to the coatings currently used to protect steel and concrete in order to perform a detailed cost analysis. Nontoxic foul-release coatings offer promise of an environmentally sound control strategy for particular facility components.

### Goals and Objectives

- Determine durability and effective service life of Sher Release (Fuji/ Sherwin Williams), Intersleek 900 (International), and Hempasil X3 (Hempel) foul-release systems on concrete and steel substrates under Columbia River field conditions relative to the current coatings used to protect concrete (CrystalSeal), and steel (USACE V-766e), as well as to bare, uncoated concrete. Effective service life is evaluated by the resistance of coatings to damage caused by field deployment and to quagga mussel attachment.
- Provide technology transfer activities through presentations of ongoing efforts and preliminary data.
- Develop technology transfer document that details cost estimate for applying foul-release coatings to selected components at Columbia River facility through consultation with USACE.
- Prepare report summarizing coating evaluations after 15 months of immersion.

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**Project Start Date:** October 1, 2012

**Project End Date:** September 30, 2015

### **Funding**

Total Project Cost: \$517,006

BPA FY2015 Budget: \$107,250

### **Reports & References (Optional)**

### **Links (Optional)**

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### **Participating Organizations**

Pacific States Marine Fisheries Commission  
Portland State University

